

IN THE  
UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Kurt E. Spears et al

Confirmation No.: 8378

Application No.: 09/558434

Examiner: Jerabek, Kelly L

Filing Date: Apr 25, 2000

Group Art Unit: 2612

Title: Photosensor Array Using Multiple Exposures To Reduce Thermal Noise

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TRANSMITTAL OF APPEAL BRIEF

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Transmitted herewith is the Appeal Brief in this application with respect to the Notice of Appeal filed on 09/29/2004.

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(complete (a) or (b) as applicable)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

( ) (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)-(d) for the total number of months checked below:

( ) one month	\$110.00
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( ) The extension fee has already been filled in this application.

(X) (b) Applicant believes that no extension of time is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

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Number of pages: 23

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Respectfully submitted,

Kurt E. Spears et al

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Date: 09/29/2004

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**PATENT APPLICATION****ATTORNEY DOCKET NO. 10001388-1**

**IN THE  
UNITED STATES PATENT AND TRADEMARK OFFICE**

**Inventor(s): Kurt Spears *et al.*****Serial No.: 09/558,434****Examiner: Jerabek, Kelly L.****Filing Date: 04/25/2000****Group Art Unit: 2612****Title: Photosensor Array Using Multiple Exposures To Reduce Thermal Noise**

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**BRIEF ON APPEAL****INTRODUCTION**

Pursuant to the provisions of 37 CFR § 1.191 *et seq.*, applicants hereby appeal to the Board of Patent Appeals and Interferences (the "Board") from the examiner's final rejection dated 07/01/2004. A notice of appeal was timely filed on 09/29/2004 concurrently with this brief on appeal, in accordance with 37 CFR § 1.8. This brief on appeal is being filed in triplicate (37 CFR § 1.192(a)) and is accompanied by the requisite fee (37 CFR 1.192(a) and 1.17(c)).

**REAL PARTY IN INTEREST**

The entire interest in the present application has been assigned to Hewlett-Packard Development Company, L.L.C., as recorded at reel 014061, frame 0492.

**RELATED APPEALS AND INTERFERENCES**

There are no related appeals or interferences.

### STATUS OF CLAIMS

Claims 1-5 are pending in the application.

Claims 1-5 have been finally rejected.

Claims 1-5 are on appeal.

### STATUS OF AMENDMENTS

There are no after-final amendments.

### SUMMARY OF CLAIMED SUBJECT MATTER

This invention relates generally to photosensor line arrays used for optical image scanners. In the example embodiments, the total time that charges reside in a charge shift register is reduced, to reduce the effects of thermal noise in the charge shift registers. Multiple exposures are used for each scan line, and only part of the pixels for each scan line are used for each exposure. *See, page 5, line 18, through page 6, line 2.* In the example of figure 2, at step 200, photosensors (*figure 1, 102*) are exposed to light a first time and the resulted charges are transferred to a charge shift register (*figure 1, 104*). At step 202, a first portion of the charges (*figure 1, 112*) are converted to digital values, and at step 204 the remaining charges (*figure 1, 114*) are discarded. At step 206, the photosensors are then exposed a second time, and the resulting charges are again transferred to the charge shift register. At step 208, for the second exposure, the first portion of the charges (*figure 1, 112*) is discarded, and at step 210 the remaining charges (*figure 1, 114*) are converted to digital values. As a result, for each exposure, the amount of time that the shift register cells are exposed to thermal noise is reduced.

The claims are as follows:

1. A method for scanning comprising (*see page 5, line 18, through page 6, line 2, and page 7, lines 3-12*):

exposing (*figure 2, 200*) an array of photosensors (*figure 1, 102*) to light from an image;  
shifting (*figure 2, 202*) a first portion of charges (*figure 1, 112*) from the array of photosensors to an amplifier (*figure 1, 106*);  
dumping (*figure 2, 204*) a second portion of the charges (*figure 1, 114*);  
exposing (*figure 2, 206*) the array of photosensors to light from the image again;  
dumping (*figure 2, 208*) the first portion of charges (*figure 1, 112*) from the array of photosensors; and  
shifting (*figure 2, 210*) the second portion of charges (*figure 1, 114*) from the array of photosensors to the amplifier.

2. The method of claim 1, the steps of dumping further comprising:

shifting (*page 7, lines 5-7 and lines 8-10*) charges from the array of photosensors at a shift rate that is higher than a normal shift rate.

3. The method of claim 1, the steps of dumping further comprising:

discharging (*page 5, lines 23-26; and page 7, lines 5-7*), simultaneously, a portion of charges from the array of photosensors.

4. The method of claim 1, wherein there is no relative movement between the array of photosensors and the image between the steps of exposing (*page 6, lines 17-24*).

5. The method of claim 1, wherein there is relative movement between the array of photosensors and the image between the steps of exposing (*page 6, lines 17-24*).

### GROUND OF REJECTION TO BE REVIEWED ON APPEAL

1. Whether claims 1 and 4 are unpatentable under 35 U.S.C. § 103(a) in light of U.S. patent number 5,308,970 (Pool).

## ARGUMENT

### CLAIMS 1-3 & 5

Claim 1 first specifies: exposing an array of photosensors to light from an image; shifting a first portion of charges from the array of photosensors to an amplifier; dumping a second portion of the charges. Pool does not teach or suggest dumping a portion of the charges from the photosensors.

The examiner characterizes a first portion of charges in Pool as the charges in register 42, and the second portion of the charges as the charges in register 44. However, Pool does not teach or suggest that both registers 42 and 44 receive charges from the photosensors for any one exposure. From Pool, column 2, lines 17-26, for figure 2, either one or the other register is used for charges from the photosensors. From Pool, column 3, lines 50-53, when one register is being used for charges from the photosensors, the other register "is outputting only a small current due mainly to the thermal effects in the CCD substrate." That is, only one register is outputting charges from the photosensors. From Pool, column 3, line 61, to column 4, line 4, the charges being dumped are the thermal noise (dark current) charges that are generated in the register, not charges from the photosensors.

In paper 9, page 3, the examiner states: "Other pockets of charge (parasitic charge) in the imaging section may be dumped into a sink (col. 2, lines 61-64). The pockets of charge in the image section are then sent through registers (42, 44) and are either shifted to the amplifier or dumped into a sink (col. 3, line 61-col. 4, line 4)." Applicant respectfully submits that these statements mischaracterize Pool. The "other pockets of charge" referred to in column 2, lines 61-64 are not from the imaging section. Likewise, the "dark current" charge referred to at column 3, line 61 to column 4, line 4, is not from the image section.

From MPEP 2142, to establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. Pool does not teach or suggest in any of the embodiments that part of the charges from the photosensors are dumped, as specified in claim 1, and accordingly, no *prima facie* case of obviousness has been established.

Claim 1 next specifies: exposing the array of photosensors to light from the image again. Note that in claim 1, for the second exposure, the photosensors are exposed to the same image as for the first exposure.

From Pool, column 1, line 67, to column 2, line 14, the dual-register embodiment is intended for time delay integration. From column 2, lines 7-27, as a line on the object being imaged moves across the array (the object being imaged is moving relative to the array), charges being integrated in the two-dimensional array are being shifted from one photosensor row to the next, synchronously with the moving line. Each individual photosensor is exposed to part of a moving image. After exposure to any one part, the charge in the photosensor is shifted to a photosensor in an adjacent row, and the photosensor is exposed to a different part of the moving image. That is, each exposure is to a different image. In that time delay integration context, there is no teaching or suggestion for first and second exposures of the photosensors to the same image.

Claim 1 next specifies dumping the first portion of charges from the array of photosensors; and shifting the second portion of charges from the array of photosensors to the amplifier.

In paper 9, page 3, continuing to page 4, the examiner argues that claim 1 does not state that dumping of the first portion of the charges from the array and shifting of the second portion of charges from the array must be performed after the second exposure. The examiner is correct in that there is no implied order to the steps in a method claim. However, for a *prima facie* case of obviousness the prior art must teach or suggest all the steps. If the location of the second exposure step within the sequence is ignored, then both the first and second portions of the charges from the photosensors are dumped. Pool does not teach or suggest dumping all the charges.

In paper 9, pages 4 and 5, the examiner apparently is arguing that Pool could expose a first time and shift the charges to one register, and then expose a second time and shift the charges to the other register. From Pool, column 2, lines 18-26, the relative motion can be in either direction, and one register would be used for one direction and the other register would be used for the other direction. However, there is no teaching or suggestion for a scenario in which the same image would be exposed twice, once in each direction. From MPEP 2143.01, the mere fact that references can be combined or modified

does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). In paper 5, pages 4 and 5, the examiner argues what Pool can do, not what Pool teaches or suggests.

#### CLAIM 4

Claim 4 specifies the method of claim 1, wherein there is no relative movement between the array of photosensors and the image between the steps of exposing. As discussed above in conjunction with claim 1, Pool at column 2, lines 7-26, expressly teaches relative movement between the photosensors and the image.

Regarding claim 4, the examiner takes official notice that photosensors may stay stationary relative to an image between exposures. Applicant agrees that a stationary camera may take two exposures of the same image. However, the examiner rejected claim 4 in light of Pool, and Pool does not teach or suggest no relative movement, and there is no teaching or suggestion to modify Pool for use when there is no relative movement. What Pool can do is irrelevant.

#### CONCLUSION

In view of the above, applicant respectfully requests that the examiner's rejection of claims 1-5 be reversed.

Respectfully submitted,



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**APPENDIX****CLAIMS ON APPEAL****1. A method for scanning comprising:**

exposing an array of photosensors to light from an image;  
shifting a first portion of charges from the array of photosensors to an amplifier;  
dumping a second portion of the charges;  
exposing the array of photosensors to light from the image again;  
dumping the first portion of charges from the array of photosensors; and  
shifting the second portion of charges from the array of photosensors to the  
amplifier.

**2. The method of claim 1, the steps of dumping further comprising:**

shifting charges from the array of photosensors at a shift rate that is higher than a  
normal shift rate.

**3. The method of claim 1, the steps of dumping further comprising:**

discharging , simultaneously, a portion of charges from the array of photosensors.

**4. The method of claim 1, wherein there is no relative movement between the array of  
photosensors and the image between the steps of exposing.****5. The method of claim 1, wherein there is relative movement between the array of  
photosensors and the image between the steps of exposing.**